TAS PowerTek, Nashik – 422 010, India.

P.F. Correction Panel Configuration Questionnaire

Standard Questionnaire for deciding the Power Factor Correction Panel configuration:

1. Define kVAr rating of panel along with Supply System AC Voltage:

Note: kVAr is always to be defined at specific voltage level.

Supply system: 3-ph, _____Volts AC line-to-line, ____ Hz Line Frequency.

2. Whether panel is required for high speed thyristor switch capacitors or conventional contactor switch application.

Compensation for Inductive / Capacitive load: If you need capacitor panel (for inductive load) or inductor panel (for capacitor load).

3. For contactor-switched capacitors, define the contactors to be used are normal 3 N.O. contact type or surge current suppression with resistor 2 sets, 3 N.O. contact type of contactors "Capacitor-Duty Power Contactor".

4. For thyristor switched capacitor type - define the elaborate details of thyristor switches.

These include:
a) Cold response time and hot response time requirements.

b) If 2 phase in line configuration or 3 phase within delta phase configuration.

c) Define continuous over-current and spike-current handling capacity of the switches.

d) Thyristor firing is active gate driving (using power for thyristor gate current driving from separate power supply source) OR passive gate driving (using voltage across the off-state thyristor for it's gate current driving).

e) If switch is with protections like:

i. Spike current protection.

ii. dv/dt sensing and avoid spurious zero voltage triggering due to transients on supply system.

iii. Maximum Voltage in worst case scenario that can appear across Thyristors and P.I.V. handling capacity.

iv. Over-Current protection and at what over-load setting value.

v. Thyristor / heat sink over temperature protection.

vi. Thyristor short circuit / open circuit monitoring.

vii. Capacitor lower-capacity (degrading of Capacitor) monitoring.

viii. Capacitor Bank Earth-fault (Grounding of the Capacitor Can) monitoring.

5. Whether panel is used with capacitors with series de-tuned reactors / suppression reactors:

Define the series reactor voltage drop value in % value:

Namely: 16.2% (134Hz), 7.68% (187Hz), 0.96% or 0.2%.

If so, define the reactors values like:

a) Continuous over-current rating.

b) Linearity at what over-current and at what accuracy % value. e.g.: 150% of rated current with 5% accuracy.

c) If required as Cu wound or Al wound.

d) Watt loss values at rated current. (Define tanδ value).

6. What type of capacitors is to be used: MPP dry, MPP oil/gas filled, APP (film foil), MD (mix dielectric).

7. Define EACH Capacitor Bank rating to be used in terms of: ... .kVAr at .....Vac-line-to-line value.

8. Specify any fixed capacitor bank to be used in the panel: If yes, kVAr Rating(s) at ..... Vac (L-to-L).

9. Define the panel incomer switchgear type along with it's Short-Circuit current protection handling capacity:
E.g. SFU, MCCB, ACB, and also define S/C capacity for these like 65kA, 50kA or 35kA or 25kA etc.

10. Define every capacitor step (fixed or switched) with protection requirements: E.g. HRC fuses, SFU units, MCB, MCCB etc.

11. Type of PF correction relay to be used: If 1-phase Supply (Load) Current sensing or 3-phase Supply (Load) Current sensing type. Also indicate if 3-Phase Capacitor Current (Total of all Capacitor Banks) is to be sensed or not sensed.

12. Define Panel IP enclosure class. IP-42 or IP-54 etc. define the sheet metal gauge for panel.

13. Define the bus-bar type used and it's cross section to be used: Copper (Cu.) or Aluminium (Al.)?

14. Any other auxiliary added features like:

a) Data Logging / SCADA System data monitoring: Access thru' RS-232 or RS-485 MOD-Bus or GPRS?

b) Duel supply with bus-coupler configuration? (Usage of Summation CTs).

c) Capacitor health monitoring by capacitor current on line monitoring.

d) Door switch for enabling or disabling capacitor supply.

Define any other special features other than mentioned above.

Additional Technical Inputs which are helpful are:

1. If load is harmonics prone: i.e. Current Harmonic distortion more than 5%.

Also, let us know if loads are majorly 3-ph balanced loads or 1-ph loads.
Thus if detuned reactors are needed, it can be determined by us.

2. Are the load changes abrupt?

This is to decide the switching system is Thyristorised (high speed) or CONTACTORISED.

3. Resolution needed of kVAr compensation: Minimum Value of kVAr Capacitor Bank Step.

4. If incomer Switchgear is SFU (Switch Fuse Unit) or ACB (Air Circuit Breaker) or without breaker (bus-bar terminations with just fuses).

5. Protection to every kVAr bank required through MCCB/MCB or just fuses.

6. Panel enclosure protection class like: IP-31 / IP-42 / IP-54.

7. Short circuit capacity of the system.

8. Bus-bar material - copper or aluminum.

9. PF correction regulator with 1-ph CT feedback or 3-ph CT feedback.

10. Any other special features needed like SCADA, communication, data logging etc.

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Contact Us: Corporate Office / Works / Design Centre:

TAS PowerTek, W-61, M.I.D.C., Ambad Industrial Area, **Nasik – 422010** (via Mumbai), Maharashtra State, India.

Contact Phones: Corporate: +0091 253 6694 953 Financials: +0091 253 6694 960

Sales & Marketing: +0091 99305 13923 / +0091 253 6694 956 Technical: +0091 253 6694 959

After Sales Support: +0091 253 6694 955 Fax.: +0091 253 6694 955

Working Hours: 9:30 AM to 6:30 PM. Weekly Off: Saturdays.

E-mails: sales@taspowertek.com, marketing@taspowertek.com, service@taspowertek.com, design@taspowertek.com